An Estimate of Solar Wind Velocity Profiles in a Coronal Hole and a Coronal Streamer Area (6-40 $R_{\odot}$)

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Using the total electron content data obtained by the Ulysses Solar Corona Experiment (SCE) during the first solar conjunction in summer 1991 (Bird *et* al., 1994), two data sets were selected, one associated with a coronal hole and the other one with coronal streamer crossings. Both data sets follow a single power law in tile range between 6 and 40 solar radii (R.), varying as $r^{-1.6}$ and $r^{-1.4}$ for the corona] hole and the streamer region, respectively. Assuming a spherically symmetric electron density distribution over the range of 10Ugitudes probed by tile radio ray path, this implies that the electron density must vary as $r^{-2.6\pm0.03}$ and $r^{-2.4\pm0.08}$ over the same range of solar distances. Using the entire data set, Bird *et al.* (1994) derived an exponential dependence $r^{-2.5\pm0.05}$.

Because the total electron content (the "observable") is the integrated sum of the electron local density along the radio ray path through interplanetary space and the inner solar corona, it is important for separating the two types of data that the most significant contribution to the electron content in each subset truly does come from the corona] hole or the streamer area. Particularly critical for the corona] hole region, this criterion was achieved for all points used in this study.

Assuming mass flux conservation from the inner corona out to one AU and identifying the fast and slow wind streams from this particular hole and the streamer belt from IMP-8 data, an estimate of the solar wind speed during the time of the tracking passes and the velocity profiles or acceleration in these two different regions can be determined.

There is extended and gradual acceleration for both regions up to 45 $R_{\odot}$. Whereas the corona] hole velocity profile reaches its asymptote of 600 km s^{-1} at approximately 50 $R_{\odot}$, the streamer profile shows slow and gradual acceleration from 6 to 45 $R_{\odot}$ and evidently continues beyond that distance (final velocity at 1 AU: 350 km s^{-1}). These results arc consistent with Helios observations (Schwenn *et al.*, 1981). Jor coronal temperatures of 106 K the critical point would be located at

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approximately 6 $R_\odot$ for the coronal streamer aud well below this distance for the coronal hole.

These results are in contrast to those of Habbal *et* al. (1995) and Grail *et al.* (1 995), who infer that the acceleration of the fast wind terminates at approximately 10 $R_\odot$. However, both papers describe the polar region of a corona] hole at solar minimum while this study concentrates on au equatorial coronal hole shortly after solar maximum. A full report is in preparation aud will be submitted to *Geophysical Research Letters* in the near future.

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